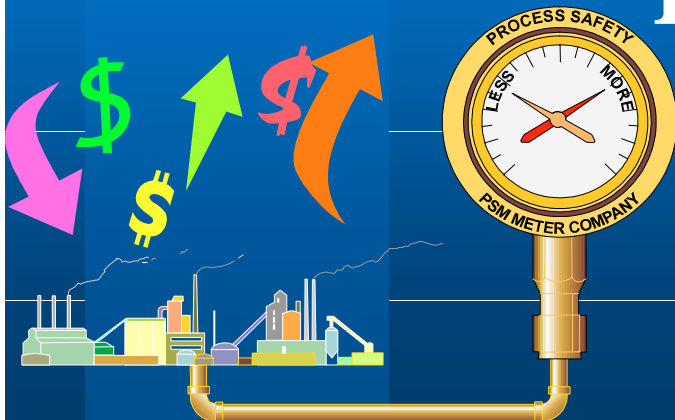# Overview of the CCPS PSM Best Practices Measurement System

A Presentation to

DOE/EFCOG

Washington, DC

October 24, 2001

Scott Berger

CENTER FOR
CHEMICAL PROCESS SAFETY

An **AIChE** Industry
Technology Alliance

CCPS

Center for Chemical Process Safety

- Since 1985

- Sponsor-driven arm of AIChE

- More than 80 Sponsors, including DOE

- More than 70 books and publications

- Find the book you need at:

http://www.aiche.org/ccps/products

CCPS Mission

To promote continuous improvement in chemical process safety we:

- **Advance state-of-the-art**
  - process safety technology and management practices
- **Serve as a premier resource**
  - for information on process safety
- **Foster process safety in education**
  - chemical and other engineering and science
- **Communicate PS as key industry value**

Presentation Outline...

- **Need for PSM Measurement**
- **What is ProSmart?**
- **CCPS PSM System**
- **Using ProSmart**
- ~~**Development Process**~~
- **Measure Structure**
- **Software Features**

You Need a PSM Measurement System

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If you:

- **Need to build a PSM program**
- **Wonder if your program is improving… or slipping**
- **Wonder if your program has a weak link**
- **Need to support creation, maintenance, or redeployment of PSM resources**

Performance Measure

"The extent or degree of something…"

- If measurable variables or indicators" can be defined, the job is easier.

- The measurement for the 100 meter dash is easy (One variable).

- As the number of variables increase weighting becomes an issue.

Challenge: handling multiple measures?

- **Finding "right" indicators enable others to successfully collect the same data.**

- **With complex systems you must utilize mathematical formulas to relate the indicators to performance.**

CCPS Has the Answer

ProSmart®

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What Is ProSmart ?

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- **A quantitative measure of PSM program**
  - **quality and**
  - **thoroughness of implementation**

- **Not a measure of outcomes,**
  - **such as the number of incidents**
  - **or hazardous chemicals released, but a**

- **"Real time" barometer of the health of a PSM system - not a periodic audit**

What Does ProSmart Do?

- **Defines** the data to be collected

- **Provides** the computer interface, and

- **Calculates** a value or index of performance.

- **Delivers** the CCPS 12-Element PSM System

  – and inclusive and flexible enough to be used as "best practices driver" for other PSM systems

Use of ProSmart

- **Intent statements provide information for each action statement or question**
- **Users input numerical ratings reflecting facility performance for each action**
- **Software calculates score relative to CCPS expert-derived ratings**
- **Users track scores, take actions, and perform "what-if" evaluations**

Benefits of ProSmart

- **Reduce risk of catastrophic accidents**
- **Improve cost-effectiveness of PSM activities**
- **Benchmark against PSM performance expectations**
- **Establish priorities for PSM improvement efforts**

Development Process

- **Early R&D lessons learned on MOC/Training**
- **Development of a robust set of essential features of a management system**
- **Identification of generic, cross-cutting aspects**
- **Creation of measure/element structure**
  - Written program indicators
  - Program implementation indicators
  - Product evaluation indicators/worksheets

CCPS PSM Performance Measure Structure

Evaluates:

- **Written program**
- **Program implementation**
- **Product evaluations**

All essential features of a management system

Written Program Indicators

- **Measure effectiveness of PSM written program.**
- **Generic - do not change from element to element**

Program Implementation Indicators

- **Measure effectiveness and completeness of program implementation**
- **Somewhat flexible to provide for differences in implementation from element to element**

Product Evaluation Indicators

- Element-specific indicators
- Measure quality of products produced by a particular PSM element

Essential Features

CCPS identified essential management system features:

- Planning
- Organizing
- Implementing
- Controlling

- # Planning Features

- **A.1 Explicit objectives and goals**
- **A.2 Well-defined scope**
- **A.3 Clear-cut desired outputs**
- **A.4 Consideration of alternative achievement mechanisms**
- **A.5 Well-defined inputs and resource requirements**
- **A.6 Identification of needed tools and training**

- # Organizing Features

- **B.1 Strong sponsorship**
- **B.2 Clear lines of authority**
- **B.3 Explicit assignment of roles/ responsibilities**
- **B.4 Formal procedures**
- **B.5 Internal coordination and communication**
- **B.6 External coordination and communication**

• Implementing Features

- C.1 Detailed work plans
- C.2 Specific milestones for accomplishments
- C.3 Initiating mechanisms

• **Controlling Features**

- D.1 Performance standards and
      measurement methods

- D.2 Variances

- D.3 Procedure renewal and reauthorization

- D.4 Reevaluation of goals and objectives

- D.5 Corrective action mechanisms

ProSmart - [Process Safety Management (PSM) - Mayberry Resins Plant]

File   Element   Tools   Window   Help

Auto Calculate | PSM Rating: 77 | CCPS Element Rating

Sensitivity…

Outline	Rating	Comment	Date	Update Interval (Days)	Days to Update
Process Safety Management (PSM)	77				
1. Accountability (Acc)	82				
2. Process Knowledge and Documentation (PKD)	79				
3. Capital Project Hazard Review (CPHR)	83				
4. Process Risk Management (PRM)	78				
5. Management of Change (MOC)	76				
6. Process and Equipment Integrity (PEI)	76				
7. Human Factors (HF)	66				
8. Training and Performance (T&P)	74				
9. Incident Investigation (II)	82				
10. Standards, Codes, and Regulations (SCR)	82				
11. Audits and Corrective Actions (ACA)	80				
12. Enhancement of Process Safety Knowledge (EPSK)	78				

Guidance

Process Safety Management (PSM)

This PSM performance measure is based on the structure developed by CCPS (Reference 1); it consists of the following twelve CCPS Elements:

1.   Accountability (Acc)
2.   Process Knowledge and Documentation (PKD)
3.   Capital Project Hazard Review (CPHR)
4.   Process Risk Management (PRM)

Process Safety Management (PSM)

ProSmart

File Element Tools Window Help

Auto Calculate

PSM Rating: 77 | 9. II Rating: 82

Process Safety Management (PSM) - Mayberry Resins Plant

Outline	Rating	Comment	Date	Update Interval (Days)	Days to Update
9. Incident Investigation (II)	82				
Written Program Indicators (II)	76				
Implementation (II)	82				
Program Implementation Indicators (II)	76				
Product Evaluation - The Investigations and Associated Documentation for an Incident or Near Miss (II)	86		3/2/2001 9:31 AM	30	0
1/14/99 Incident	45		8/25/2000 8:47 AM		
7/13/2000 Near Miss	49		9/25/2000 9:31 AM		
8/16/2000 Near Miss	50		10/24/2000		

Guidance   Parent Section

Product Evaluation - The Investigations and Associated Documentation for an Incident or Near Miss (II)

The product evaluation should address the following questions.

- Did the program products meet the quality standards?
- Were work activities sufficiently thorough?
- Were the specified work products produced?
- Do program activities document consideration of alternate methods and selection of the best to achieve the objectives?
- Were adequate resources (people, funding, time) made available at all times and used to accomplish the program objectives?
- Were the specified inputs available for program work?
- Were the specified tools available and used?

BETA TEST PARTICIPANTS

- **BAYER --- Berkeley, CA**
- **CELANESE --- Clear Lake, TX**
- **GOODYEAR --- Beaumont, TX**
- **3M --- Cordova, IL**
- **PFIZER --- Groton, CT**

Lord Kelvin

"When you can measure what you are speaking about and express it in numbers, you know something about it; but when you cannot measure it, when you cannot express it in numbers, your knowledge is of a meager and unsatisfactory kind."